FIT *(Fungal Pathogenesis, Tumerogenesis, and Effects on Host Immunity in Space)*

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Ames Research Center

Objective:

- Characterize the effects that the space flight environment has on the fly immune system cellular and molecular biology, and functional ability to combat bacterial or fungal infection.
- Determine if the space flight environment alters the microbial pathogenesis of an insect fungal pathogen.
- Ground experiments to assess proton radiation effects on whole organism physiology, including immunity.

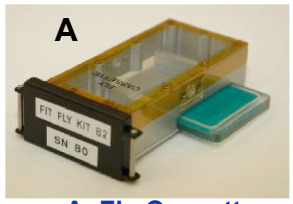
Relevance/Impact:

- Directly addresses questions concerning how the space flight environment alters the functions of the immune system and microbial pathogenesis, for which there is currently only anecdotal information.

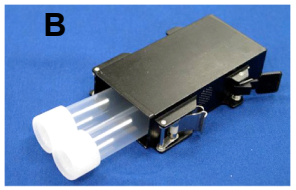
Development Approach:

- Use modified ESA hardware design to obtain a pure population of eggs, embryos, and larvae that only experience the space flight environment prior to landing
- Part of the post-flight analysis was conducted at KSC to allow immediate assessment of the cellular and functional immune system changes to the live flight specimens

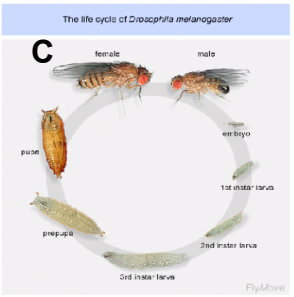
Current Status: The flight experiment was conducted extremely successfully with two generations of animals returned in excellent condition. Approximately 3200 animals returned and are being analyzed, several changes have been noted in flight vs ground flies.

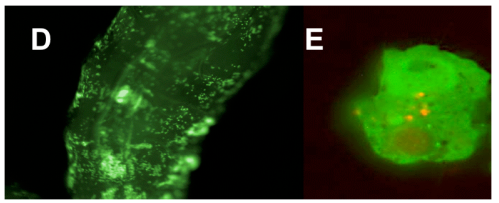


A. Fly Cassette



B. Fungus Kit





C. Drosophila melanogaster life cycle; D. GFP-labeled immune cells in a larva; E. Bacteria (red) phagocytosed by hemocyte (analogous to a human macrophage).

ISS Resource Requirements

Accommodation (carrier)	Middeck
Upmass (kg) (w/o packing factor)	2.9
Volume (m^3) (w/o packing factor)	0.0035
Power (kw) (peak)	N/A
Crew Time (hrs) (installation/operations)	0.66
Launch/Increment	ULF1.1/Increment 13

Project Life Cycle Schedule

Milestones	PDR	CDR	CT	Safety	FRR	Launch	Ops	Return	Final Report
Actual/ Baseline	3/3/05	3/3/05	6/20/05	4/20/05	5/30/06	7/4/06	Sortie	7/16/06	Ground cntrl + 1 year